

What is claimed is

1. A patient support apparatus comprising:  
a frame;  
a deck coupled to the frame, the deck including a back section, a seat  
5 section and a thigh section, the back, seat and thigh sections being longitudinally  
spaced apart and transversely extending with at least the back and thigh sections being  
articulated relative to the frame,  
a back section drive,  
a first thigh section drive, and  
10 a second thigh section drive,  
the back section drive being coupled to the back section to move the  
back section between a lowered position and a raised position through an intermediate  
position therebetween,  
the back section drive and the first thigh section drive being operatively  
15 coupled together such that the thigh section moves from a lowered position to a raised  
position as the back section moves from the lowered position to the intermediate  
position and such that the thigh section moves from the raised position to the lowered  
position as the back section moves from the intermediate position to the raised  
position, and  
20 the second thigh section drive being coupled to the thigh section and  
being operable independent of the back section drive to raise and lower the thigh  
section.
2. The apparatus of claim 1, wherein the back section provides the  
operative connection between the back section drive and first thigh section drive.
- 25 3. The apparatus of claim 2, wherein the movement of the back  
section moves the first thigh section drive.
4. The apparatus of claim 1, wherein the back section is coupled  
to the first thigh section drive such that movement of the back section causes the first  
thigh section drive to move the thigh section.
- 30 5. The apparatus of claim 4, wherein the first thigh section drive  
comprises a track coupled to the frame, and a track-engaging member movable along  
the track and coupled to the thigh section and coupled to the back section.

6. The apparatus of claim 5, wherein the track includes a first straight portion along which the track-engaging member moves to raise the thigh section and a second inclined portion along which the track-engaging member moves to lower the thigh section as the back section is raised.

5 7. The apparatus of claim 5, wherein the track-engaging member movable along the track is a roller.

8. The apparatus of claim 7, wherein the track-engaging roller is coupled to the back section to be moved along the track initially along the straight portion to raise the thigh section and then along the inclined portion to lower the thigh section as the back section is raised.

9. The apparatus of claim 8, wherein the first thigh section drive includes a center pivoting linkage having a first end coupled to the frame for pivoting movement about a fixed pivot pin, a second end coupled to the track-engaging roller for pivoting movement about a movable pivot pin, and a middle end rotatably coupled to a lifting roller configured to be coupled to the thigh section so that the thigh section is initially raised and then lowered as the back section is raised.

10. The apparatus of claim 8, wherein the first thigh section drive includes first and second links, wherein the first link has a first end coupled to the frame for pivoting movement about a fixed pivot pin and a second end coupled to a first end of the second link for pivoting movement about a center pivot pin, wherein the second link has a second end coupled to the track-engaging roller for pivoting movement about a movable pivot pin, and wherein the first thigh section drive includes a lifting roller coupled to the center pivot pin and configured to be coupled to the thigh section so that the thigh section is initially raised and then lowered as the back section is raised.

11. The apparatus of claim 2, wherein the thigh section drive includes a linkage configured to be coupled to the thigh section and a spring clutch coupling back section to the linkage.

12. The apparatus of claim 11, wherein the spring clutch includes a housing, a coil gripping spring received inside the housing and a connecting rod, wherein the spring clutch is lockable so that the gripping spring constricts around the connecting rod preventing the connecting rod from sliding relative to the gripping

spring and the clutch housing to couple the back section to the linkage so that the thigh section is initially raised and then lowered as the back section is raised, the spring clutch is releasable so that the gripping spring loosens its grip on the connecting rod allowing the connecting rod to slide relative to the gripping spring and the clutch housing to decouple the back section from the linkage so that the back section can be raised without also raising the thigh section.

13. The apparatus of claim 12, including a handle coupled to the spring clutch, and movable to a first position where the spring clutch is locked to couple the back section to the linkage and to a second position where the spring clutch is released to decouple the back section from the linkage.

14. The apparatus of claim 13, wherein the handle is located near a foot end of the apparatus.

15. The apparatus of claim 14, including a release rod coupled to the handle and a cable coupling the release rod to the spring clutch.

16. The apparatus of claim 15, including a latch plate coupled to the back section and coupled to the release rod for locking the release rod when the back section is raised and freeing the release rod when the back section is not raised.

17. The apparatus of claim 13, wherein the handle is located near a head end of the apparatus.

18. A patient support apparatus comprising:  
a frame,

a deck coupled to the frame, the deck including a back section, a seat section and a thigh section, the back, seat and thigh sections being longitudinally spaced apart and transversely extending with at least the back and thigh sections being articulated relative to the frame,

a back section drive coupled to the back section to raise and lower the back section,

a first thigh section drive coupled to the back section and the thigh section to initially raise and then lower the thigh section as the back section is raised,  
and

a second thigh section drive coupled to the thigh section and operable independent of the back section drive to raise and lower the thigh section.

19. The apparatus of claim 18, wherein the first thigh section drive comprises a track coupled to the frame, and a track-engaging member movable along the track and coupled to the thigh section and coupled to the back section.

20. The apparatus of claim 19, wherein the track includes a first  
5 straight portion along which the track-engaging member moves to raise the thigh section and a second inclined portion along which the track-engaging member moves to lower the thigh section as the back section is raised.

21. The apparatus of claim 20, wherein the track-engaging member  
movable along the track is a roller.

10 22. The apparatus of claim 21, including linkage coupling the track-engaging roller to the back section to move the track-engaging roller along the track initially along the straight portion to raise the thigh section and then along the inclined portion to lower the thigh section as the back section is raised.

23. The apparatus of claim 22, wherein the linkage comprises a  
15 spring clutch including a housing, a coil gripping spring received inside the housing and a connecting rod, the connecting rod having a first end coupled to the back section for pivoting movement about a pivot pin, the connecting rod having a second end slidably received inside the gripping spring, wherein the spring clutch is lockable so that the gripping spring constricts around the connecting rod preventing the  
20 connecting rod from sliding relative to the gripping spring and the clutch housing to couple the back section to the track-engaging roller so that the thigh section is initially raised and then lowered as the back section is raised, the spring clutch is releasable so that the gripping spring loosens its grip on the connecting rod allowing the connecting rod to slide relative to the gripping spring and the clutch housing to decouple the back  
25 section from track-engaging roller so that the back section can be raised without also raising the thigh section.

24. The apparatus of claim 23, including a handle coupled to the spring clutch, and movable to a first position where the spring clutch is locked to couple the back section to the track-engaging roller and to a second position where the  
30 spring clutch is released to decouple the back section from the track-engaging roller.

25. The apparatus of claim 24, wherein the handle is located near a foot end of the apparatus.

26. The apparatus of claim 25, including a release rod coupled to the handle and a cable coupling the release rod to the spring clutch.

27. The apparatus of claim 26, including a latch plate coupled to the back section and coupled to the release rod for locking the release rod when the  
5 back section is raised and freeing the release rod when the back section is not raised.

28. The apparatus of claim 27, including a bracket having a first end coupled to the clutch housing and a second end rotatably coupled to the track-engaging roller.

29. A patient support apparatus comprising:  
10 a frame,

a deck coupled to the frame, the deck including a back section, a seat section and a thigh section, the back, seat and thigh sections being longitudinally spaced apart and transversely extending with at least the back and thigh sections being articulated relative to the frame,

15 a first thigh section drive coupled to the back section and the thigh section to initially raise and then lower the thigh section as the back section is raised, and

a second thigh section drive coupled to the thigh section and operable independent of the back section to raise and lower the thigh section.

20 30. The apparatus of claim 29, including a back section drive coupled to the back section to raise and lower the back section.

31. A patient support apparatus comprising:  
a frame,

25 a deck coupled to the frame, the deck including a back section, a seat section and a thigh section, the back, seat and thigh sections being longitudinally spaced apart and transversely extending with at least the back and thigh sections being articulated relative to the frame,

a back section drive,

a thigh section drive, and

30 the back section drive being coupled to the back section to raise and lower the back section,

the back section drive and the thigh section drive being operatively coupled together such that the thigh section is raised and lowered as the back section is raised and lowered, and

the back section drive including a control coupled to the back section  
5 near the head end thereof that can be actuated to adjust the position of the back section.

32. The apparatus of claim 31, wherein the control comprises a manually-actuated release bar movably coupled to the underside of the back section.

33. The apparatus of claim 32, wherein the release bar is movable  
10 between a first locking position spaced apart from the underside of the back section where the back section is prevented from moving relative to the frame, and a second releasing position spaced closer to the underside of the back section where the back section is allowed to move relative to the frame.

34. The apparatus of claim 31, wherein the back section provides  
15 the operative connection between the back section drive and thigh section drive.

35. The apparatus of claim 34, wherein the movement of the back section moves the thigh section drive.

36. The apparatus of claim 34, wherein the back section is coupled  
20 to the thigh section drive such that movement of the back section causes the thigh section drive to move the thigh section.

37. A patient support apparatus comprising  
a frame,  
a deck coupled to the frame and configured to support a patient, the  
deck including a first section coupled to the frame and a second section coupled to the  
25 frame,

a control assembly coupled to the first section and to the second section, the control assembly being configured to initially raise and then lower the second section as the first section is raised, and

a drive coupled to the second section and operable independent of the  
30 control assembly to raise and lower the second section.

38. A patient support apparatus comprising  
a frame,

a deck coupled to the frame and configured to support a patient, the  
deck including a first section coupled to the frame for movement from a lowered  
5 position to a raised position through an intermediate position therebetween, the deck  
including a second section coupled to the frame for movement between a raised  
position and a lowered position,

a control assembly coupled to the first section and coupled to the  
second section, the control assembly being configured to move the second section  
10 from the lowered position to the raised position as the first section moves from the  
lowered position to the intermediate position, and the control assembly being  
configured to move the second section from the raised position to the lowered position  
as the first section moves from the intermediate position to the raised position, and  
a drive coupled to the second section and operable independent of the  
15 control assembly to raise and lower the second section.

39. A patient support apparatus comprising:  
a frame,

a deck coupled to the frame, the deck including a back section, a seat  
section and a thigh section, the back, seat and thigh sections being longitudinally  
20 spaced apart and transversely extending,

the back section being movable relative to the frame between a  
lowered position and a raised position through an intermediate position therebetween,  
a first thigh section drive coupled to the back section and the thigh  
section such that the thigh section moves from the lowered position to the raised  
25 position as the back section moves from the lowered position to the intermediate  
position and such that the thigh section moves from the raised position to the lowered  
position as the back section moves from the intermediate position to the raised  
position, and

a second thigh section drive coupled to the thigh section and operable  
30 independent of the back section to raise and lower the thigh section.

40. A patient support apparatus comprising:

a frame,

a deck coupled to the frame, the deck including a back section, a seat section and a thigh section, the back, seat and thigh sections being longitudinally spaced apart and extending transversely with at least the back and thigh sections being  
5 movable relative to the frame,

a first thigh section drive coupled to the back section and the thigh section to initially raise and then lower the thigh section in response to movement of the back section away from a lowered position, and

10 a second thigh section drive coupled to the thigh section and operable independent of the back section to raise and lower the thigh section.

41. A patient support apparatus comprising:

a frame,

a deck coupled to the frame, the deck including a back section, a seat section and a thigh section, the back, seat and thigh sections being longitudinally spaced apart and transversely extending with at least the back and thigh sections being articulated relative to the frame,

a back section drive coupled to the back section to raise and lower the back section,

20 a thigh section drive configured to be coupled to the back section and the thigh section to initially raise and then lower the thigh section as the back section is raised,

a thigh section drive enabling/disabling mechanism having a first state where the thigh section drive is decoupled from the back section and having a second state where the thigh section drive is coupled to the back section, and  
25

a thigh section drive locking mechanism configured to prevent the operation of the thigh section drive enabling/disabling mechanism when the back section is raised.

42. The apparatus of claim 41, wherein the thigh section drive enabling/disabling mechanism includes a handle, and wherein the handle is movable  
30 between a first releasing position where the thigh section drive is decoupled from the



back section and a second locking position where the thigh section drive is coupled to the back section.

43. The apparatus of claim 42, wherein the back section includes a frame member, wherein the handle is coupled to the frame member near the head end of the patient support apparatus, wherein the handle is normally biased in the first releasing position spaced apart from the frame member, and wherein the handle is movable to the second locking position spaced closer to the frame member.

44. The apparatus of claim 43, wherein the frame member includes a pair of corner portions near the head end, wherein thigh section drive enabling/disabling mechanism includes a pair of handles coupled to the frame member adjacent to the respective corner portions, wherein the handles are normally biased in the first releasing position spaced apart from the respective corner portions, and wherein the handles are movable to the second locking position spaced closer to the respective corner portions.

45. The apparatus of claim 42, wherein the thigh section drive includes a linkage coupled to the thigh section and a spring clutch coupling the linkage to the back section.

46. The apparatus of claim 45, wherein the spring clutch includes a housing, a coil gripping spring received inside the housing and a connecting rod, wherein the spring clutch is releasable so that the gripping spring loosens its grip on the connecting rod allowing the connecting rod to slide relative to the clutch housing and the gripping spring to decouple the back section from the linkage so that the back section can be raised and lowered without also raising and lowering the thigh section, and wherein the spring clutch is lockable so that the gripping spring constricts around the connecting rod preventing the connecting rod from sliding relative to the clutch housing and the gripping spring to couple the back section to the linkage so that the thigh section is initially raised and then lowered as the back section is raised.

47. The apparatus of claim 46, wherein the spring clutch includes a trigger plate which is movable between a first releasing position where the spring clutch is released and a second locking position where the spring clutch is locked, and wherein the handle is coupled to the trigger plate to move the trigger plate between the first releasing position and the second locking position.

48. The apparatus of claim 47, wherein the thigh section drive enabling/disabling mechanism includes including a release rod, a spring biasing the release rod against the trigger plate to hold the trigger plate in the first releasing position and a cable coupling the release rod to the handle, and wherein the actuation  
5 of the handle pulls the release rod away from the trigger plate to free the trigger plate to move to the second locking position.

49. The apparatus of claim 48, wherein the release rod includes two locking grooves corresponding to the two positions of the handle, wherein the thigh section drive locking mechanism includes a latch plate having a locking edge and a  
10 spring biasing the locking edge of the latch plate against the release rod into one of the two locking grooves in the release rod to prevent the release rod from moving when the back section is raised, and wherein the movement of the back section to the horizontal position displaces the latch plate in a direction disengaging the locking edge of the latch plate from the release rod and freeing the release rod.

50. The apparatus of claim 41, wherein thigh section drive enabling/disabling mechanism includes a handle coupled to the frame near the foot end of the patient support apparatus, and wherein the handle is movable between a first locking position on a first side of the patient support apparatus where the thigh section drive is coupled to the back section and a second releasing position on a  
20 second side of the patient support apparatus where the thigh section drive is decoupled from the back section.

51. The apparatus of claim 50, wherein the thigh section drive includes a linkage coupled to the thigh section and a spring clutch coupling the linkage to the back section.

52. The apparatus of claim 51, wherein the spring clutch includes a housing, a coil gripping spring received inside the housing and a connecting rod, wherein the spring clutch is lockable so that the gripping spring constricts around the connecting rod preventing the connecting rod from sliding relative to the clutch housing and the gripping spring to couple the back section to the linkage so that the  
30 thigh section is initially raised and then lowered as the back section is raised, and wherein the spring clutch is releasable so that the gripping spring loosens its grip on the connecting rod allowing the connecting rod to slide relative to the clutch housing

and the gripping spring to decouple the back section from the linkage so that the back section can be raised and lowered without also raising and lowering the thigh section.

53. The apparatus of claim 52, wherein the spring clutch includes a trigger plate which is a movable between a first locking position where the spring  
5 clutch is locked and a second releasing position where the spring clutch is released, and wherein the handle is coupled to the trigger plate to move the trigger plate between the first locking position and the second releasing position.

54. The apparatus of claim 53, wherein the thigh section drive enabling/disabling mechanism includes a release rod coupled to the handle and a cable  
10 coupling the release rod to the trigger plate, and wherein the movement of the handle from the first locking position to the second releasing position pulls the release rod and the cable in a direction that moves the trigger plate to the second releasing position.

55. The apparatus of claim 54, wherein the release rod includes two  
15 locking grooves corresponding to the two positions of the handle, wherein the thigh section drive locking mechanism includes a latch plate having a locking edge and a spring biasing the locking edge of the latch plate into one of the two locking grooves in the release rod to prevent the release rod from moving when the back section is raised, and wherein the movement of the back section to the horizontal position  
20 displaces the latch plate in a direction disengaging the locking edge of the latch plate from the release rod and freeing the release rod.

56. The apparatus of claim 54, wherein the thigh section drive locking mechanism further includes a rocker arm coupled to the back section and a cable coupling the rocker arm to the latch plate, and wherein the movement of the  
25 back section to the horizontal position displaces the rocker arm in a direction that pulls the latch plate to free the release rod.

57. A patient support apparatus comprising:  
a frame,  
a deck coupled to the frame, the deck including a back section that is  
30 pivotable relative to the frame and a thigh section that is pivotable relative to the frame,

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a lockable and releasable back section drive coupled to the back section,

a lockable and releasable auto contour mechanism coupled to the back section and coupled to the thigh section,

5 a first handle coupled to the back section and movable between a locking position locking the back section relative to the frame and a releasing position releasing the back section for pivoting movement relative to the frame, and

a second handle coupled to the back section and movable between a coupling position coupling the auto contour mechanism to the back section and a  
10 decoupling position decoupling the auto contour mechanism from the back section.

58. The apparatus of claim 57, wherein the first and second handles are coupled to the back section near the head end of the patient support apparatus.

59. The apparatus of claim 57, wherein the back section drive includes a gas spring coupled to the back section, and wherein the first handle is a  
15 release bar coupled to the gas spring and coupled to the back section near the head end of the patient support apparatus.

60. The apparatus of claim 57, wherein the auto contour mechanism includes a linkage coupled to the thigh section and a spring clutch coupled to the linkage and coupled to the back section, and wherein the second handle  
20 comprises a pair of handles coupled to the spring clutch and coupled to the back section near the head end on opposite sides of the patient support apparatus.